UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,136	12/09/2003	Mariko Matsumoto	NEG-325US	3191

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ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/730,136	MATSUMOTO, MARIKO
Office Action Summary	Examiner	Art Unit	
	CURTIS B. ODOM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>29 December 2003</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-18 and 20-53</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1,2,5,7,8,13,15,25,26,29,31,32,37,39 and 51-53</u> is/are rejected.

7) ☒ Claim(s) <u>3,4,6,9-12,14,16-18,20-24,27,28,30,33-36,38 and 40-50</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>29 December 2003</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All b) ☐ Some * c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   Claims 2-10, 13, 14, 16, 28, 30, 39, 42, and 48 are objected to because of the following informalities: In claims 2-6, 13, 14 "said third step" is suggested to be changed to "said selecting step". In claims 7-8, "said second step" is suggested to be changed to "said updating step". In claims 9, 10, 16, "said first and second steps" is suggested to be changed to "said presupposing and updating steps".   In claims 6, 28 and 30, the phrase "a/the value found last time" is suggested to be changed to "a previous threshold value". In claim 39, the phrase "the on the differences" is suggested to be changed to "on the difference". In claim 42, the phrases, "means for selecting" and "means for using" are suggested to be changed to "wherein threshold value detection unit includes means for selecting….means for using". In claim 42, "the value calculated last time" is suggested to be changed to "the previously calculated threshold value". In claim 48, "said amplitude modulating unit" is suggested to be changed to "an amplitude modulating unit".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 2, 5, 7, 8, 13, 15, 25, 26, 29, 31, 32, 37, 39, and 51-53 are rejected under 35

U.S.C. 103(a) as being unpatentable over Payne et al. (US 2002/0122504) in view of Iwamatsu

et al. (US 2001/0010709).

Regarding claim 1, Payne et al. discloses a method for estimating a threshold value in

deciding data along an amplitude by a terminal performing wireless communication with a

wireless station in accordance with a multi-level signal, the method comprising the steps of:

presupposing using preceding bit positions (see section 0020) in which one of multiple

levels can be the level of a received data signal and setting up a plurality of threshold values (see

section 0022) assumed in association with the presupposition;

updating (see section 0023) sequentially (by only updating the selected threshold) the

assumed threshold values based on the bit decisions of the received data (see sections 0034-

0036); and

selecting (see section 0020) an ultimate threshold value from the plural assumed

threshold values.

Payne et al. does not disclose the multilevel signal is a QAM signal. However, Iwamatsu

et al. discloses estimating threshold values of multilevel QAM signals (see section 0009)

including presupposing multiple conventional threshold levels (see sections 0072 and 0078) and

updating these threshold levels based on received data (see sections 0078, 0090 and 0111).

Therefore, it would have been obvious to implement the multilevel threshold estimation method

of Payne et al. into a multilevel QAM threshold estimation as described by Iwamatsu et al. since

Payne et al. states this threshold estimation method compensates for ISI (section 0008).

Regarding claim 2, Payne et al. discloses selecting the optimum threshold based on the

occurrence of bits with respect to the respective threshold levels partitioned based on an eye

pattern (see Fig. 2 and Fig. 3, section 0027).

Regarding claim 5, Payne et al. discloses selecting an optimum threshold with a smaller

closest path difference of calculated average data levels from the respective received data (see

section 0027).

Regarding claim 7, Payne et al. discloses presuming data position levels for the totality of

plural assumed threshold values (see section 0034-0036), from one received data to another, and

calculating the totality of the assumed threshold values as described in sections 0034-0036.

Regarding claim 8, Payne et al. discloses detection which level the received data belongs

(see section 0027) and wherein at least some of the plural assumed thresholds are not updated

each time (see section 0023), wherein only the selected threshold is updated.

Regarding claim 13, Payne et al. discloses the updating is terminated after 1500 bits (see

section 0034 and selecting one of the plural assumed thresholds (see section 0020).

Regarding claim 15, Iwamatsu et al. discloses deciding which assumed threshold is

correct based on an error (difference) between the received data and the received data with

respect to the assumed threshold (see section 0114-0115). This threshold is assumed to be

correct and the output of the discriminator/demodulator using the correct threshold is output.

Therefore, it would have been obvious to include this feature since Iwamatsu et al. states this

feature compensates for distortion (see section 0115).

Regarding claim 25, Payne et al. discloses a terminal apparatus (Fig. 1) performing

wireless communication with a wireless station in accordance with a multi-level modulation, the

terminal apparatus comprising:

an amplitude synchronization detection (Fig. 1, block 36, section 0022) unit for

estimating a threshold value for deciding data along an amplitude; and

an amplitude demodulating unit (Fig. 1, block 26) for effecting amplitude demodulation

using the threshold value;

the amplitude synchronization detection unit including:

a setup unit (Fig. 1, block 36, section 0020 and 0022) presupposing which level the

received data signal may belong to and for setting up a plural number of threshold values that

may be assumed in association with the presupposition;

a update unit (Fig. 1, blocks 40-43, see sections 0023 and 0034-0036) sequentially

updating the assumed threshold values based on the received data signal bit decision; and

a selection unit (Fig. 1, block 28, section 0020) selecting an ultimate threshold value from

the plural assumed threshold values.

Payne et al. does not disclose the multilevel modulation signal is a QAM signal.

However, Iwamatsu et al. discloses estimating threshold values of multilevel QAM signals (see

section 0009) including presupposing multiple conventional threshold levels (see sections 0072

and 0078) and updating these threshold levels based on received data (see sections 0078, 0090

and 0111).   Therefore, it would have been obvious to implement the multilevel threshold

estimation method/apparatus of Payne et al. into a multilevel QAM threshold estimation as

described by Iwamatsu et al. since Payne et al. states this threshold estimation method/apparatus

compensates for ISI (section 0008).

Regarding claim 26, Payne et al. discloses selecting the optimum threshold based on the

occurrence of bits with respect to the respective threshold levels dividing a signal space based on

an eye pattern (see Fig. 2 and Fig. 3, section 0027).

Regarding claim 29, Payne et al. discloses selecting an optimum threshold with a smaller

closest path difference of calculated average data levels from the respective received data (see

section 0027).

Regarding claim 31, Payne et al. discloses presuming data position levels for the totality

of plural assumed threshold values (see section 0034-0036), from one received data to another,

and calculating the totality of the assumed threshold values as described in sections 0034-0036.

Regarding claim 32, Payne et al. discloses detection which level the received data

belongs (see section 0027) and wherein at least some of the plural assumed thresholds are not

updated each time (see section 0023), wherein only the selected threshold is updated.

Regarding claim 37, Payne et al. discloses the updating is terminated after 1500 bits (see

section 0034 and selecting one of the plural assumed thresholds (see section 0020).

Regarding claim 39, Iwamatsu et al. discloses deciding which assumed threshold is

correct based on an error (difference) between the received data and the received data with

respect to the assumed threshold (see section 0114-0115). This threshold is assumed to be

correct and the output of the discriminator/demodulator using the correct threshold is output.

Therefore, it would have been obvious to include this feature since Iwamatsu et al. states this

feature compensates for distortion (see section 0115).

Regarding claim 51, Iwamatsu et al. further discloses a base station (see Fig. 1) in communication with a mobile radio (as disclosed in section 0004) using multilevel QAM. It would have been obvious to implement the multilevel threshold estimation method/apparatus of Payne et al. into a multilevel QAM communication system as described by Iwamatsu et al. since Payne et al. states this threshold estimation method/apparatus compensates for ISI (section 0008).

Regarding claims 52 and 53, Payne and Iwamatsu disclose all the limitation of claims 52 and 53 (see rejections of claims 1 and 25). Iwamatsu further discloses a mobile station (see section 0004) apart of a radio/cellular communication system communicating with a base station (as shown in Fig. 1) using QAM across a high-speed channel for large capacity data transmission (see section 0006). Therefore, it would have been obvious to implement the multilevel threshold estimation method/apparatus of Payne et al. into a multilevel QAM system as described by Iwamatsu et al. since Payne et al. states this threshold estimation method/apparatus compensates for ISI (section 0008).

Allowable Subject Matter

4.   Claims 3, 4, 6, 9-12, 14, 16-18, 20-24, 27, 28, 30, 33-36, 38, and 40-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form (and above objections are overcome) including all of the limitations of the base claim and any intervening claims.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. Gersbach et al. (U. S. Patent No. 5, 295, 155) discloses estimating and selecting

thresholds for detection of multilevel signals.

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to CURTIS B. ODOM whose telephone number is (571)272-3046.

The examiner can normally be reached on Monday- Friday, 9-5:30.

       If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

       Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Curtis B. Odom/

Primary Examiner, Art Unit 2611
June 8, 2008